CANADA
DEPARTMENT OF MINES
GEOLOGICAL SURVEY BRANCH
Hon. W. Templeman, Minister; A. P. Low, Deputy Minister;
R. W. Brock, Director.

MEMOIR No. 14—N

# NEW SPECIES OF SHELLS

## COLLECTED BY MR. JOHN MACOUN AT BARKLEY SOUND, VANCOUVER ISLAND, BRITISH COLUMBIA

DESCRIBED
BY
WILLIAM H. DALL, and PAUL BARTSCH

OTTAWA
GOVERNMENT PRINTING BUREAU
1910

No. 1143

4494—1

To R. W. Brock, Esq.,
Director Geological Survey,
Department of Mines, Ottawa.

Sir,—We beg to submit the following memoir describing a number of new species of shells collected by Mr. John Macoun, at Barkley sound, Vancouver island, B.C. The illustrations were drawn by Miss Evelyn G. Mitchell.

We have the honour to be, sir,
Your obedient servants,

(Signed) W. H. Dall.
Paul Bartsch.

Washington, D.C., U.S.A.,
May 28, 1910.

## CONTENTS.


PAGE.

INTRODUCTION—

Physical characteristics of British Columbian coast described.... 7
Marine fauna of oceanic margin, and inner passages of archipelago, markedly different.. .. .. .. .. .. .. .. .. .. .. .. .. 7
Cause of differentiation.. .. .. .. .. .. .. .. .. .. .. .. .. .. 7
History of conchological explorations on the coast.. .. .. .. .. .. 7
Four new species of *Pyrgolampros* discriminated.. .. .. .. .. 8
Collaboration of Messrs. C. H. Young and Spreadborough with Mr. John Macoun.. .. .. .. .. .. .. .. .. .. .. .. .. .. .. 8
On the naming of the newly discovered species.. .. .. .. .. .. .. 8
Acknowledgment of Miss Mitchell's work.. .. .. .. .. .. .. .. .. 9

Description of New Species—

*Leda penderi*, Dall and Bartsch.. .. .. .. .. .. .. .. .. .. .. .. 9
*Bela maurellei*, Dall and Bartsch.. .. .. .. .. .. .. .. .. .. .. .. 9
*Mangilia hectæ*, Dall and Bartsch .. .. .. .. .. .. .. .. .. .. .. .. 10
*Mangilia arteaga*, Dall and Bartsch.. .. .. .. .. .. .. .. .. .. .. 11
*Boreotrophon macouni*, Dall and Bartsch.. .. .. .. .. .. .. .. .. 12
*Epitonium* (Scala) *caamanoi*, Dall and Bartsch.. .. .. .. .. .. .. 13
*Turbonilla* (*Pyrgolampros*) *talama*, Dall and Bartsch.. .. .. .. 10
*Turbonilla* (*Pyrgolampros*) *pesa*, Dall and Bartsch.. .. .. .. .. 14
*Turbonilla* (*Pyrgolampros*) *rinella*, Dall and Bartsch.. .. .. .. 14
*Turbonilla* (*Pyrgolampros*) *macouni*, Dall and Bartsch.. .. .. .. 15
*Odostomia* (*Evalea*) *youngi*, Dall and Bartsch.. .. .. .. .. .. .. 16
*Odostomia* (*Evalea*) *spreadboroughi*, Dall and Bartsch.. .. .. .. 17
*Odostomia* (*Evalea*) *quadræ*, Dall and Bartsch.. .. .. .. .. .. .. 17
*Odostomia* (*Evalea*) *vancouverensis*, Dall and Bartsch.. .. .. .. 18
*Odostomia* (*Evalea*) *barkleyensis*, Dall and Bartsch.. .. .. .. .. 19
*Bittium vancouverensis*, Dall and Bartsch.. .. .. .. .. .. .. .. .. 19

List of species identified—

Bivalves (8).. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. 21
Gastropods (50).. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. 21


## ILLUSTRATIONS.

Plate I.

Fig. 1. *Epitonium caamanoi*; length of (decollate) shell 9.5 mm.
" 2. *Turbonilla* (*Pyrgolampros*) *rinella;* length 8.5 mm. The fine spiral striation is omitted from the figure.
" 3. *Leda penderi;* dorsal view of specimen; length 9.2 mm.
" 4. The same in profile.
" 5. *Bela maurellei*; length 8.5 mm.
" 6. *Mangilia hecetæ;* length 9.0 mm.
" 7. *Boreotrophon macouni*; length 13 mm.
" 8. *Bittium vancouverensis;* length 7.8 mm.
" 9. *Turbonilla* (*Pyrgolampros*) *macouni*; length 14.8 mm.

Plate II.

Fig 1. *Odostomia* (*Evalea*) *youngi;* length 6.5 mm.

" 2. *Odostomia* (*Evalea*) *spreadboroughi*; length 3.8 mm.

" 3. *Turbonilla* (*Pyrgolampros*) *talama;* length 9.0 mm. The fine spiral striations have been omitted from this figure.

" 4. *Mangilia arteaga;* length 10.25 mm.

" 5. *Turbonilla* (*Pyrgolampros*) *pesa;* length 6.0 mm. Spiral striation omitted from this figure.

" 6. *Odostomia* (*Evalea*) *quadrae;* length 6.2 mm. Spiral striation omitted.

" 7. *Odostomia* (*Evalea*) *vancouverensis;* length 4.7 mm. Spiral striation omitted.

" 8. *Odostomia* (*Evalea*) *barkleyensis*; length 3.1 mm. Spiral striation omitted.

# DESCRIPTION

OF

# NEW SPECIES OF SHELLS COLLECTED BY MR. JOHN MACOUN AT BARKLEY SOUND, VANCOUVER ISLAND, BRITISH COLUMBIA.

BY

William H. Dall, and Paul Bartsch.[1]

Mr. John Macoun, of the Geological Survey, Canada, having requested that some of the less familiar species of shells collected in the northwest part of Barkley sound and Ucluelet arm, during his dredgings in 1908-9, be examined by the senior author of this memoir, the work was undertaken with much interest; and as will be seen, was fully warranted.

The northwest coast from Columbia river to the Alaskan peninsula is fairly rich in molluscan life. From the Straits of Fuca to Cross sound the coast is bordered with a wide archipelago, and much of the commerce, and nearly all the tourist traffic is carried on through the inland passages behind these islands. It has been discovered by the senior author that the marine fauna of the inner passages, and that of the oceanic margin of the archipelago, are distinctly different. The former—perhaps affected by the discharge of cold water from glacier-fed streams, and the shutting off of the sun's rays from the narrow passages by their mountainous shores and prevalent fogs—is markedly of a more boreal character than the latter. On the oceanic border, many of the species which belong to the Californian fauna creep northward to a distance not yet exactly determined, but certainly as far as Sitka sound. For obvious reasons the greater amount of collecting has been done along the tourist route, and in the quieter inland waters. Certain localities have been quite well explored: such as the vicinity of Puget sound,

[1] By permission of the Director of the U. S. National Museum.

Victoria, and Nanaimo, and Sitka sound in Alaska; but there are long stretches where the collector has never worked.

On the oceanic border very little collecting has been done, except by Dr. George Dawson about the Queen Charlotte islands; and by W. H. Dall at the entrance to Sitka sound.

Barkley sound is on the southwestern edge of Vancouver island, hence the collection of Dr. Macoun is one of the first made along the oceanic side of the island.

An examination of the small species showed not only a number of forms known, hitherto, only from considerably farther south; but an unexpected number of species hitherto unknown: especially among the Pyramidellidæ.

In the present collection there are four new species of *Pyrgolampros*, which raises the number to twelve for the Oregonian faunal area. Two of these, *Turbonilla* (*Pyrgolampros*) *macouni*, and *Turbonilla* (*Pyrgolampros*) *talama*, belong to the strongly ribbed group; the first being nearest related to *Turbonilla* (*Pyrgolampros*) *keepi*, D. and B., of California, from which it differs by being much larger, and in having fewer and stronger ribs. *Turbonilla* (*Pyrgolampros*) *talama* ranges nearer *Turbonilla* (*Pyrgolampros*) *taylori*, D. and B.; but is stouter, with a less number of much stronger ribs.

The other two species belong to the obsoletely ribbed group of *Pyrgolampros*. Of this group, only one was known from the Oregonian faunal area previously, namely, *Turbonilla* (*Pyrgolampros*) *oregonensis*, D. and B. Two other species belonging to this group—*Turbonilla* (*Pyrgolampros*) *lituyana*, D. and B. and *Turbonilla* (*Pyrgolampros*) *halistrepta*, D. and B. come from Alaska, and California, respectively. Both of the new species are nearest related to *Turbonilla* (*Pyrgolampros*) *halistrepta*, D. and B.; from which *Turbonilla* (*Pyrgolampros*) *pesa* is at once distinguished by its more slender form and smaller size; and *Turbonilla* (*Pyrgolampros*) *rinella* by its more pronounced sculpture.

Mr. John Macoun was assisted in making the collection by Messrs. C. H. Young, and William Spreadborough, and at his request their names have been associated with two of the new species.

In the case of others, we have availed ourselves of the harmonious names of some of the early Spanish explorers who co-operated with Vancouver in his survey of the shores of British Columbia:

Arteaga, Maurelle, Heceta, and Caamano. One of the new species is named after Staff Commander Pender, R.N.; who was engaged for some years in hydrographic surveys on the British Columbia coast.

The illustrations of the new species have been drawn by Miss Evelyn G. Mitchell, by the aid of the camera lucida, from the actual type specimens.

The following species appear to be new:—

LEDA PENDERI, Dall and Bartsch.

PLATE I, FIGS. 3 AND 4.

Shell, small, solid, equivalve, nearly equilateral: the posterior side slightly longer, lighter or darker olivaceous in colour, tumid, with the anterior end rounded; the posterior angularly rostrate, the extreme end slightly recurved; anterior and posterior slopes nearly equal, the former a little convex, the latter slightly concave, the base convexly arcuate; lunule, not defined, represented by a lanceolate narrow space, longitudinally striated; escutcheon similarly striated, impressed, broadly lanceolate, bounded in each valve externally by a stout keel, the apposited margins hardly pouting in the median line; beaks, low, and adjacent; sculpture of the disk composed of numerous concentric ridges, less arcuate than the incremental lines, and separated by wider interspaces; more adjacent near the anterior end of the shells. An obscure radial ridge extends from the beaks toward the anterior end of the base. Interior, polished, bluish, with entire margin. Ligament, small, wholly internal. Hinge-teeth small, V-shaped, numbering sixteen anterior (of which six are small and crowded), and fourteen posterior (of which six are very small), separated by the ligamentary pit, which is small and not projecting. Length of average adult, 9·2; of beaks behind the anterior margin, 4·2. Maximum height, 6·0. Maximum diameter, 5·0 mm. Some specimens are proportionally less inflated.

Collected by Mr. John Macoun, Nos. 38 a–c, in 8 to 36 fathoms, Ucluelet to Ship channel.

The nearest recent species to this is *Leda excavata,* Hinds, from Panama bay, which is somewhat smaller, with a sharper posterior angle and more recurved rostrum, fewer posterior and more anterior teeth, and more deeply excavated escutcheon. With the present

species was associated the widespread *L. acuta*, Conrad, which is a more elongated and less inflated species.

BELA MAURELLEI, Dall and Bartsch.

PLATE I, FIG. 5.

Shell, small, fusiform, greenish white, with about six whorls. First whorl of the nucleus, flattish, minute, apparently smooth; second whorl with a sharp prominent shoulder-keel, crossed by numerous minute riblets, much lower than the keel. On the next whorl the periphery bears a keel like that at the shoulder, and the riblets gradually become stronger, and fewer in number, diminishing, however, on the following whorls to mere axial striations; the peripheral keel also losing its prominence. On the later whorls, which still preserve—though with less prominence—the keel at the shoulder, the spiral sculpture becomes predominant, and on the spire there are about four spiral threads between the shoulder and the suture in front of it, and on the last whorl about ten between the shoulder and the beginning of the canal, which is also spirally striated. The prominent shoulder gives a turrited aspect to the whorls: the aperture being narrow; the outer lip sharp; the anal sulcus shallow and feeble; the pillar white, and attenuate in front; and the canal short, and wide. The operculum is ovate, somewhat concave, and with an apical nucleus. Height of (not quite mature) shell, 8·5; of last whorl, 5·5; of aperture, 4·0; maximum diameter of shell, 3·5 mm.

Collected by Mr. John Macoun, No. 28*a*, in 9 fathoms, gravelly bottom.

The sculpture of this little shell being rather unusual for a *Bela*, the dried animal was soaked out, and proved to be white, with prominent black eyes. The radula had broken up, but enough of it was found to show that the shell has the typical dentition of *Bela*. The species obviously belongs to the group represented by *Bela grippii*, Dall, from San Diego, California, which has a somewhat similar sculpture.

MANGILIA HECETÆ, Dall and Bartsch.

PLATE I, FIG. 6.

Shell, small, thin, acute-fusiform, externally of a greyish colour. Whorls, about seven, the initial whorl minute, and smooth; the

second bulbous, and smooth; the next, finely reticulated by fine spiral threads, and somewhat protractive arcuate fine riblets. This sculpture gradually merges into that of the adult whorls; the latter comprise—on the last whorl—eleven or twelve arcuate ribs, retractive from the suture, protractive from the shoulder of the whorl forward to the canal. These ribs are narrow, low, rather rounded, and with interspaces of about twice their own width. The whorl slopes in a somewhat excavated manner from the suture to the shoulder, where there is a moderate angulation, sometimes forming a rather strong spiral cord; the rest of the surface is covered with very fine, close, even, spiral threading, a little coarser on the earlier whorls; aperture elongate, and narrow; the anal sinus wide and shallow; pillar white, with anterior end attenuated; interior of aperture white, with three brown spiral bands, wide and dark, on the inside of the outer lip, but not visible on the exterior of the shell; the outer lip is sharp except when a varix is formed, when it is slightly reflected inward; operculum, none; canal short, straight, and rather wide. Height of shell, 9·0; of last whorl, 5·3; of aperture, 4·5; maximum diameter of shell, 3·25 mm.

Collected by Mr. John Macoun, No. 33*a* (part). A few specimens were obtained in 8 to 34 fathoms.

This species does not agree with any yet described from that region, and is perhaps nearest to the next species, which has the spiral sculpture conspicuously unequal.

MANGILIA ARTEAGA, Dall and Bartsch.

PLATE II, FIG. 4.

Shell, small, acute-fusiform, having about eight whorls, the initial whorl extremely minute, subsequent whorls slowly enlarging, minutely reticulate. The later whorls have a strongly marked shoulder, and are, when young, of a reddish-brown colour, which gradually changes with exposure to a light grey. The sculpture of the adult whorls consists of (on the last whorl about ten) prominent, slightly arcuate, nearly axial ribs, rather sharply nodose at the intersection with the angle of the shoulder, with wider interspaces and continuous to the canal. As to the spiral sculpture of major and minor threads, there are about ten of the former in front of the shoulder, of which two are visible behind the suture on the spire;

the remainder—which are much finer and minutely rugose—occupy the interspaces of the whole surface, the major threads being slightly swollen where they cross the ribs: aperture narrow; anal sinus shallow, and small; pillar and throat brownish, with a brown obscure band under the suture; outer lip sharp between, and thickened at the varices; canal short, and wide; operculum, none. Height of shell, 10·25; of last whorl, 6·5; of aperture, 4·6; maximum diameter of shell, 4·0 mm.

Collected by Mr. John Macoun, No. 33*a* (part), in 8 to 34 fathoms, rather common.

Somewhat resembling the *Mangilia sculpturata*, Dall, from Alaska, in which, however, the minute rasplike sculpture is absent, and the shell considerably larger.

BOREOTROPHON MACOUNI, Dall and Bartsch.

PLATE I, FIG. 7.

Shell, small, dark purple, with the prominences white. Whorls about six, the nuclear smooth and submamillary; the succeeding whorls with (on the last, nine) prominent, thin, sharp varices, sharply angulated at the shoulder; whorls subtabulate, the suture distinct but not deep; sculpture (beside the varices) of two to seven low revolving flat ridges which appear whitish against the purple ground-colour, and numerous fine, spiral, almost microscopic lines often obsolete; beside the angle at the shoulder there are usually two of these ridges on the spire behind the last whorl; they hardly modify the varices; aperture small, subovate, with the outer lip somewhat expanded; canal white, rather long and narrow, directed somewhat toward the left. Height of the shell, 13·0; of the last whorl, 9·0; maximum diameter, 6·0 mm.

Collected by Mr. John Macoun, No. 66*a*, in the Ship channel, in 19 to 34 fathoms, soft, muddy bottom.

The species of this group are generally whitish; the deep purple of this collection being rather exceptional. It is quite markedly distinguished from the other species by its colour and sculpture. There are usually four spiral ridges on the last whorl; but one specimen has seven, and another only two.

EPITONIUM (SCALA)[1] CAAMANOI, Dall and Bartsch.

PLATE I, FIG. 1.

Shell, small, rather conic, white, with thirteen broadly reflexed, axially conspicuously striated varices; nucleus? (lost); whorls, more than six, varices continuous up the spire, narrow near the suture, more than doubling in width at the shoulder, where they are provided with a small spine or prominent angulation, then continuing to the base, where they are again narrowly contracted; there is no basal cord or disk, the umbilicus is closed; the surface of the whorls between the varices is smooth; the whorls are evenly rounded, and the aperture, if perfect, would probably be nearly circular. Length of six whorls (decollate), 9·5; diameter at base, 5·0, at decollation, 0·7; of aperture, 2·0 mm.

Collected by Mr. John Macoun, No. 77*a* (in part), with four other species of the genus, and two dead specimens, in from 7 to 10 fathoms.

Though both the specimens of this species were dead, and more or less broken, it is evidently distinct from any other yet named from the coast, and for that reason it seemed desirable to describe it.

TURBONILLA (PYRGOLAMPROS) TALMA, Dall and Bartsch.

PLATE II, FIG. 3.

Shell, broadly elongate-conic, dark chestnut brown, wax-yellow at the apex and the columellar area. Nuclear whorls decollated. Postnuclear whorls moderately rounded, feebly shouldered at the summit, marked by strong, well rounded, axial ribs, of which eighteen occur upon each of the turns. Intercostal spaces about two-thirds as wide as the ribs, well impressed. Sutures strongly impressed. Periphery of the last whorl well rounded. Base moderately long, and well rounded, showing scarcely any traces of the axial ribs. Entire surface of spire and base crossed by numerous fine, closely spaced, spiral striations. Aperture oval; posterior angle acute; outer lip thin, showing a lighter band half way between the periphery and the

[1] The name *Scala* or *Scalaria* has become so familiar in the literature of conchology, though untenable for this genus, that we have thought it best to insert it in parentheses as a synonym, and *not as a section* of the genus properly called *Epitonium*, Bolten.

summit, in the general chestnut coloration; columella slender, twisted and slightly revolute, white.

Two specimens of this species were dredged in Barkley sound, Vancouver island, B.C., one of which is in the Geological Survey Museum, Ottawa; the other in the collection of the United States National Museum, Catalogue No. 211537. One of these has lost the nucleus, the ten remaining whorls measuring: length, 9 mm., diameter, 2·8 mm.

### Turbonilla (Pyrgolampros) pesa, Dall and Bartsch.

Plate II, Fig. 5.

Shell, elongate-conic, small, chestnut brown, with a slightly paler, broad, obscure band half way between the sutures. Nuclear whorls decollated. Post-nuclear whorls flattened, slightly shouldered at the summit, marked by feeble, almost vertical, axial ribs: of which 22 occur upon the second, 24 upon the third, 20 upon the fourth and fifth, and 26 upon the sixth of the remaining turns. Upon the penultimate turn the ribs are subobsolete. Intercostal spaces feebly impressed, of irregular width. Sutures well impressed. Periphery of the last turn somewhat inflated, well rounded; base short, well rounded. Entire surface of spire and base crossed by numerous very fine, closely spaced, spiral striations. Aperture broadly oval; posterior angle acute; outer lip thin, showing the external markings within by transmitted light; columella moderately strong, slightly curved and revolute.

The unique type was dredged in Barkley sound, Vancouver island, B.C. It has eight post-nuclear whorls (having lost the nucleus, and probably the first one and a half post-nuclear turns), and measures: length, 6 mm., diameter, 1·6 mm.

### Turbonilla (Pyrgolampros) rinella, Dall and Bartsch

Plate I, Fig. 2.

Shell, elongate-conic, reddish wax-yellow, a little lighter on the posterior half between the sutures; anterior half of base almost white. Nuclear whorls decollated. Posterior two-thirds of the post-nuclear whorls between the sutures flattened; anterior third rounding moderately towards the periphery; whorls marked by feebly

developed, low, broad, retractive, axial ribs, which are separated by narrow, shallow, intercostal spaces. Of these ribs, twenty-two occur upon the fourth, twenty-four upon the fifth and sixth, twenty-six upon the seventh, and about forty-two upon the last of the remaining turns. Upon the last they are very irregular and even less strongly developed than on the preceding. Suture well impressed. Periphery of the last whorl somewhat inflated, well rounded, with scarcely any traces of axial sculpture. Entire surface of spire and base marked with numerous wavy, closely spaced, spiral striations. Aperture broadly oval; posterior angle acute; outer lip thin; columella oblique, slender, and revolute; parietal wall covered with a fairly thick callus.

The unique type was collected in Barkley sound, Vancouver island, B.C., and is in the collection of the Geological Survey, Ottawa.

It has nine whorls remaining, which measure: length, 8·5 mm., diameter, 2·3 mm.

### Turbonilla (Pyrogolampros) macouni, Dall and Bartsch.

Plate I, Fig. 9.

Shell, large, very broadly elongate-conic, pale wax-yellow, with three chestnut bands. The first of these bands extends over the posterior fourth of the whorls between the sutures, and is less strongly coloured than the other two which are very pronounced, about half as wide as the first, and occupy the space immediately anterior and posterior to the periphery; the space which separates them being a little narrower than the band. Nuclear whorls small, almost two; depressed helicoid, having their axes almost at right angles to that of the succeeding turns; scarcely at all immersed. Post-nuclear whorls flattened on the posterior two-thirds between the sutures, slightly rounded anteriorly; moderately shouldered at the summit; marked by strong, well rounded, somewhat sinuous, almost vertical, axial ribs which are about as wide as the spaces which separate them. Of these ribs, eighteen occur upon the second, twenty upon the third and fourth, eighteen upon the fifth to seventh, twenty upon the eighth and ninth, twenty-two upon the tenth and penultimate turn. Periphery of the last well rounded. Base of the last whorl moderately long, well rounded, marked by the feeble con-

summit, in the general chestnut coloration; columella slender, twisted and slightly revolute, white.

Two specimens of this species were dredged in Barkley sound, Vancouver island, B.C., one of which is in the Geological Survey Museum, Ottawa; the other in the collection of the United States National Museum, Catalogue No. 211537. One of these has lost the nucleus, the ten remaining whorls measuring: length, 9 mm., diameter, 2·8 mm.

### Turbonilla (Pyrgolampros) pesa, Dall and Bartsch.

Plate II, Fig. 5.

Shell, elongate-conic, small, chestnut brown, with a slightly paler, broad, obscure band half way between the sutures. Nuclear whorls decollated. Post-nuclear whorls flattened, slightly shouldered at the summit, marked by feeble, almost vertical, axial ribs: of which 22 occur upon the second, 24 upon the third, 20 upon the fourth and fifth, and 26 upon the sixth of the remaining turns. Upon the penultimate turn the ribs are subobsolete. Intercostal spaces feebly impressed, of irregular width. Sutures well impressed. Periphery of the last turn somewhat inflated, well rounded; base short, well rounded. Entire surface of spire and base crossed by numerous very fine, closely spaced, spiral striations. Aperture broadly oval; posterior angle acute; outer lip thin, showing the external markings within by transmitted light; columella moderately strong, slightly curved and revolute.

The unique type was dredged in Barkley sound, Vancouver island, B.C. It has eight post-nuclear whorls (having lost the nucleus, and probably the first one and a half post-nuclear turns), and measures: length, 6 mm., diameter, 1·6 mm.

### Turbonilla (Pyrgolampros) rinella, Dall and Bartsch

Plate I, Fig. 2.

Shell, elongate-conic, reddish wax-yellow, a little lighter on the posterior half between the sutures; anterior half of base almost white. Nuclear whorls decollated. Posterior two-thirds of the post-nuclear whorls between the sutures flattened; anterior third rounding moderately towards the periphery; whorls marked by feebly

developed, low, broad, retractive, axial ribs, which are separated by narrow, shallow, intercostal spaces. Of these ribs, twenty-two occur upon the fourth, twenty-four upon the fifth and sixth, twenty-six upon the seventh, and about forty-two upon the last of the remaining turns. Upon the last they are very irregular and even less strongly developed than on the preceding. Suture well impressed. Periphery of the last whorl somewhat inflated, well rounded, with scarcely any traces of axial sculpture. Entire surface of spire and base marked with numerous wavy, closely spaced, spiral striations. Aperture broadly oval; posterior angle acute; outer lip thin; columella oblique, slender, and revolute; parietal wall covered with a fairly thick callus.

The unique type was collected in Barkley sound, Vancouver island, B.C., and is in the collection of the Geological Survey, Ottawa.

It has nine whorls remaining, which measure: length, 8·5 mm., diameter, 2·3 mm.

TURBONILLA (PYROGOLAMPROS) MACOUNI, Dall and Bartsch.

PLATE I, FIG. 9.

Shell, large, very broadly elongate-conic, pale wax-yellow, with three chestnut bands. The first of these bands extends over the posterior fourth of the whorls between the sutures, and is less strongly coloured than the other two which are very pronounced, about half as wide as the first, and occupy the space immediately anterior and posterior to the periphery; the space which separates them being a little narrower than the band. Nuclear whorls small, almost two; depressed helicoid, having their axes almost at right angles to that of the succeeding turns; scarcely at all immersed. Post-nuclear whorls flattened on the posterior two-thirds between the sutures, slightly rounded anteriorly; moderately shouldered at the summit; marked by strong, well rounded, somewhat sinuous, almost vertical, axial ribs which are about as wide as the spaces which separate them. Of these ribs, eighteen occur upon the second, twenty upon the third and fourth, eighteen upon the fifth to seventh, twenty upon the eighth and ninth, twenty-two upon the tenth and penultimate turn. Periphery of the last well rounded. Base of the last whorl moderately long, well rounded, marked by the feeble con-

tinuations of the axial ribs. Entire surface of spire and base marked by numerous, closely spaced, very fine, spiral striations. Aperture moderately large, broadly oval; posterior angle obtuse; outer lip thin, showing the external markings within; columella slender, moderately curved and slightly revolute; parietal wall glazed with a thin callus.

Specimens of this species were dredged in Barkley sound, part of which are in the Geological Survey Museum collection at Ottawa, and two at the United States National Museum, where they are listed as Catalogue No. 211538, U.S.N.M. One of the specimens has the nucleus and ten post-nuclear whorls, and measures: length, 9 mm., diameter, 3 mm.; another has ten post-nuclear whorls (having lost the nucleus and probably the first two post-nuclear turns), and measures: length, 14·8 mm., diameter, 4·5 mm.

In adult shells the basal band becomes much expanded, even to the extent of covering the posterior half of the base.

The present species—the finest of the west American *Pyrgolampros*—recalls *Turbonilla* (*Pyrgolampros*) *keepi*, D. and B.; but is much larger than that form, with fewer and stronger ribs.

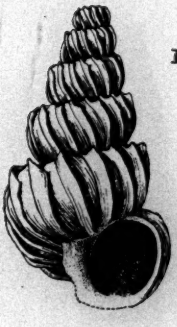
ODOSTOMIA (EVALEA) YOUNGI, Dall and Bartsch.

PLATE II, FIG. 1.

Shell, elongate-conic, umbilicated, milk-white. Nuclear whorls small, obliquely immersed in the first of the post-nuclear turns, above which only the tilted edge of the last volution projects. Post-nuclear whorls moderately rounded, with a narrow tabulatedly shouldered summit, marked by equally spaced, rather strong, spiral striations, of which about thirty-two occur between the summit and the periphery on the penultimate turn. Periphery and base of the last whorl inflated, well rounded, marked with spiral sculpture equal in strength and disposition to that on the spire. Sutures strongly impressed. In addition to the spiral sculpture, the whorls are marked with curved retractive lines of growth. Aperture pear-shaped; posterior angle acute; outer lip thin; columella slender, curved, and somewhat revolute, provided with a strong oblique fold a little anterior to its insertion; parietal wall glazed with a thick callus.

Specimens—one of which is in the Geological Survey Museum, Ottawa, and the other in the United States National Museum, Catalogue No. 211542—were dredged in 18 to 20 fathoms in Ship

PLATE I.



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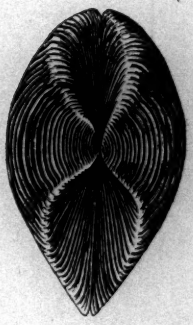

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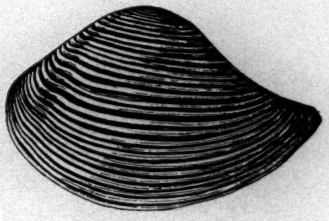

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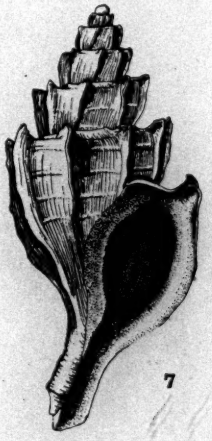

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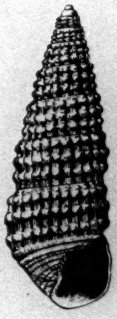

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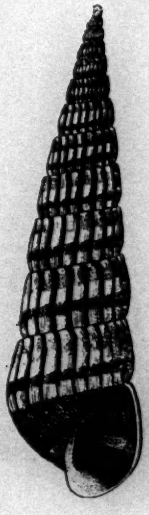

9

channel, Barkley sound, Vancouver island, B.C. One of these specimens has seven post-nuclear whorls, and measures: length, 6·5 mm., diameter, 2·4 mm.

Named for Mr. C. H. Young, of the Geological Survey, Ottawa, at the request of Mr. John Macoun.

ODOSTOMIA (EVALEA) SPREADBOROUGHI, Dall and Bartsch.

PLATE II, FIG. 2.

Shell, elongate-ovate, somewhat translucent, bluish-white. Nuclear whorls small, deeply, very obliquely immersed within the first of the succeeding turns. Post-nuclear whorls inflated, flattened in the middle, rounded strongly at the summit and the suture, marked by decidedly sinuous, exceedingly fine lines of growth and fine spiral striations; the latter are less strongly developed on the posterior two-thirds between the sutures than on the anterior third and on the base. Sutures strongly constricted. Periphery of the last whorl and base inflated, well rounded, the latter deeply and strongly umbilicated. Aperture oval; posterior angle acute; outer lip thin, showing the external sculpture within; columella very slender, strongly curved and slightly revolute, provided with a very faint, oblique fold a little anterior to its insertion; parietal wall glazed with a thin callus.

There are three specimens of this species, two of which are in the Geological Survey Museum collection at Ottawa, and one (Catalogue No. 211541) is in the United States National Museum. All three were dredged in 18 to 28 fathoms at Ship channel, Barkley sound, Vancouver island, B.C. The specimen figured has five post-nuclear whorls, and measures: length, 3·8 mm., diameter, 1·9 mm.

ODOSTOMIA (EVALEA) QUADRÆ, Dall and Bartsch.

PLATE II, FIG. 6.

Shell, elongate-ovate, milk-white, umbilicated. Nuclear whorls deeply, obliquely immersed in the first of the post-nuclear turns, above which only the tilted edge of the last volution projects. Post-nuclear whorls moderately rounded, moderately shouldered at the summit, marked by faint, slightly retractive lines of growth, and

numerous, exceedingly fine, microscopic, spiral striations. In addition to this sculpture, the last whorl shows many weak malleations. Periphery of the last whorl and the moderately long base somewhat inflated, well rounded, marked like the spire. Aperture large, oval; posterior angle acute; outer lip thin; columella very oblique, slightly curved and strongly revolute, extending partly over the umbilicus, provided with a moderately strong fold a little anterior to its insertion; parietal wall glazed with a thin callus.

Fifty-three specimens of this species were dredged in 18 to 28 fathoms at Ship channel, Barkley sound, Vancouver island, B.C. Part of these are in the Geological Survey Museum collection at Ottawa; the remainder are in the United States National Museum collection, Catalogue No. 211540. The figured specimen has six post-nuclear whorls, and measures: length, 6·2 mm., diameter, 3·2 mm.

ODOSTOMIA (EVALEA) VANCOUVERENSIS, Dall and Bartsch.

PLATE II, FIG. 7.

Shell, elongate-ovate, very narrowly umbilicated, turrited, yellowish-white. Nuclear whorls small, obliquely immersed in the first of the succeeding turns, above which only half of the last volution projects and extends beyond the outline of the spire. Post-nuclear whorls broadly, tabulatedly shouldered at the summit, moderately rounded, marked by almost vertical lines of growth and numerous exceedingly fine spiral striations. Sutures rendered very conspicuous by the tabulated shoulder. Periphery of the last whorl well rounded, base moderately long, well rounded, marked like the spire. Aperture large, elongate-ovate, somewhat effuse anteriorly; posterior angle decidedly obtuse; outer lip thin; columella slender, oblique, and somewhat revolute, provided with an oblique fold a little anterior to its insertion; parietal wall glazed with a thin callus.

Specimens of this species were dredged in 18 to 28 fathoms at Ship channel, Barkley sound, Vancouver island, B.C., part of which are in the collection of the Geological Survey, Ottawa, and others in the United States National Museum, Catalogue No. 211539. The specimen figured has five post-nuclear whorls, and measures: length, 4·7 mm., diameter, 2·2 mm.

The strongly tabulated summit of the whorls separates this species from all the known *Evaleas* of the Oregonian faunal area.

ODOSTOMIA (EVALEA) BARKLEYENSIS, Dall and Bartsch.

PLATE II, FIG. 8.

Shell, small, regularly conic, bluish-white. Nuclear whorls deeply, obliquely immersed in the first of the succeeding turns, above which only the tilted edge of the last volution projects. Post-nuclear whorls slightly rounded, marked by fine retractive lines of growth and numerous fine, spiral striations. Sutures strongly impressed. Periphery of the last whorl subangulated. Base rather short, sloping from the subangulated periphery to its anterior margin, with a tumid area bounding the narrow umbilicus, marked like the spire. Aperture oval; posterior angle acute; outer lip thin; columella decidedly curved and reflected, provided with a strong oblique fold at its insertion; parietal wall glazed with a moderately thick callus.

Specimens of this species were dredged in 18 to 28 fathoms in Barkley sound, Vancouver island, B.C. Part of them are in the Geological Survey Museum collection at Ottawa, and others in the United States National Museum, Catalogue No. 211543. The specimen figured has five and a half post-nuclear whorls, and measures: length, 3·1 mm., diameter, 1·4 mm.

BITTIUM VANCOUVERENSIS, Dall and Bartsch.

PLATE I, FIG. 8.

Shell, elongate-conic, greyish-white outside and dark purplish-brown within. Nuclear whorls at least two, apparently smooth; worn in all the specimens. Post-nuclear whorls slightly rounded, ornamented with three strong, equal, and equally spaced, nodulose, spiral keels, of which the first is a little below the summit. The spaces separating the spiral keels are of equal widths. Immediately below the third keel is a strong peripheral sulcus, which equals those between the spiral keels. In addition to the spiral sculpture, the whorls are marked by almost vertical, axial ribs which are not quite as wide as the spiral keels. These render the keels nodulose at their intersection. Of these ribs, twelve occur upon the first, fourteen upon

the second and third, sixteen upon the fourth, eighteen upon the fifth, twenty-four upon the sixth, and thirty upon the penultimate turn. The spaces enclosed between the spiral keels and the axial ribs are well impressed, rounded pits. All the tubercles are truncated on the posterior margin, and slope gently anteriorly. Base of the last whorl moderately long, ornamented with seven spiral cords, of which the two immediately below the periphery are the strongest and broadest, while the two bounding the umbilical area are wider than those intervening. Sutures channeled. Aperture irregular, channeled anteriorly; posterior angle obtuse; outer lip thin, sinuous, showing the external sculpture within; columella stout, short, twisted and reflected; parietal wall glazed with a moderately thick callus. The specimen figured has eight post-nuclear whorls, and measures: length, 7·8 mm., diameter, 2·7 mm.

Specimens of this species were dredged in 8 to 27 fathoms from Ucluelet to Ship channel, Barkley sound, Vancouver island, B.C. Part of these are in the collection of the Geological Survey, Ottawa, and others are in the United States National Museum collection, Catalogue No. 211545.

## LIST OF SPECIES IDENTIFIED.[1]

### BIVALVES.

**Leda penderi*, D. and B.
*Leda acuta*, Conrad. Rather rare.
*Pecten caurinus*, Gould. A very young shell.
*Mytilus edulis*, L., var. *lucidus*. Sooke, B.C.
*Psephidia lordi*, Baird. Common in clean sands.
*Thracia curta*, Conrad. Rare.
*Entodesma inflata*, Conrad. Southern fauna.
*Cuspidaria planetica*, Dall. Two specimens from 29 fathoms, mud, near Forbes island. Not uncommon in Southern fauna.

### GASTROPODS.

*Volvula cylindrica*, Carpenter. Southern fauna.
**Bela maurellei*, D. and B. Rare.
**Mangalia hecetæ*, D. and B. Rare.
**Mangilia arteaga*, D. and B. Numerous.
*Astyris tuberosa*, Carpenter. Southern fauna.
**Boreotrophon macouni*, D. and B.
*Tritonalia lurida*, Middendorff.
*Tritonalia lurida*, var. *aspera*, Baird.
*Tritonalia munda*, Carpenter.
*Epitonium* (*Scala*) *indianorum*, Carpenter (young).
*Epitonium* (*Scala*) *acrostephanus*, Dall. Rare.
*Epitonium* (*Scala*) *sawinæ*, Dall. Southern fauna.
*Epitonium* (*Scala*) *crebricostatum*, Carpenter.
**Epitonium* (*Scala*) *caamanoi*, D. and B.
*Turbonilla* (*Strioturbonilla*) *vancouverensis*, Baird. Abundant.
*Turbonilla* (*Strioturbonilla*) *serræ*, D. and B. Abundant. Southern fauna.
*Turbonilla* (*Pyrgolampros*) *victoriana*, D. and B. Rare.
*Turbonilla* (*Pyrgolampros*) *valdezi*, D. and B. Rare.
*Turbonilla* (*Pyrgolampros*) *newcombei*, D. and B. Rare.
*Turbonilla* (*Pyrgolampros*) *taylori*, D. and B. Abundant.

[1] New species are indicated by an asterisk—thus, *

**Turbonilla (Pyrgolampros) talama,* D. and B. Rare.
**Turbonilla (Pyrgolampros) macouni,* D. and B. Rare.
**Turbonilla (Pyrgolampros) pesa,* D. and B. Rare.
**Turbonilla (Pyrgolampros) rinella,* D. and B. Rare.
*Turbonilla (Mormula) eschscholtzi,* D. and B. Abundant.
*Odostomia (Evalea) valdezi,* D. and B. Abundant.
**Odostomia (Evalea) vancouverensis,* D. and B. Rare.
**Odostomia (Evalea) spreadboroughi,* D. and B. Rare.
**Odostomia (Evalea) youngi,* D. and B. Rare.
**Odostomia (Evalea) barkleyensis,* D. and B. Rare.
*Odostomia (Evalea) tenuisculpta,* D. and B. Rare. Southern fauna.
*Odostomia (Evalea) angularis,* D. and B. Abundant.
*Odostomia (Evalea) stephensi,* D. and B. Abundant.
*Odostomia (Evalea) deliciosa,* D. and B. Rare. Southern fauna.
*Odostomia (Amaura) kennerleyi,* D. and B. Abundant.
**Odostomia (Amaura) quardræ,* D. and B. Rare.
*Odostomia (Amaura) canfieldi,* D. and B. Rare. Southern fauna.
*Bittium munitum,* Carpenter. Southern fauna.
*Bittium esuriens,* Carpenter. Southern fauna.
**Bittium vancouverensis,* D. and B.
*Cæcum crebricinctum,* Carpenter. Rare.
*Alvania compacta,* Carpenter. Common.
*Barleeia haliotiphila,* Carpenter. Southern fauna.
*Leptothyra carpenteri,* Pilsbry. Dark variety. Southern fauna.
*Halistylus subpupoideus,* Tryon.
*Lepidopleurus internexus,* Carpenter.
*Ischnochiton radians,* Carpenter. Albino.
*Ischnochiton radians,* Carpenter. Normal.
*Trachydermon flectens,* Carpenter, var. *montereyensis,* Cpr. Southern fauna.
*Mopalia ciliata,* Sowerby, var. *elevata,* Pilsbry.

⊕

CANADA

# DEPARTMENT OF MINES

**GEOLOGICAL SURVEY BRANCH**

Hon. W. Templeman, Minister; A. P. Low, Deputy Minister;
R. W. Brock, Director.

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# SELECTED LIST OF REPORTS AND MAPS

## (SINCE 1885)

## OF SPECIAL ECONOMIC INTEREST

PUBLISHED BY

THE GEOLOGICAL SURVEY.

**Reports of the Mines Section:—**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| No. 245. | Report of Mines Section, | 1886. | No. 662. | Report of Mines Section, | | | 1897. |
| 272 | " " | 1887. | 698 | " " | | | 1898. |
| *300 | " " | 1888. | 718 | " " | | | 1899. |
| 301 | " " | 1889. | 744 | " " | | | 1900. |
| 334 | " " | 1890. | 800 | " " | | | 1901. |
| 335 | " " | 1891. | 835 | " " | | | 1902. |
| 360 | " " | 1892. | 893 | " " | | | 1903. |
| 572 | " " | 1893-4. | 928 | " " | | | 1904. |
| 602 | " " | 1895. | 971 | " " | | | 1905. |
| 625 | " " | 1896. | | | | | |

**Mineral Production of Canada:—**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. *414. | Year | 1886. | No. *422. | Year | 1893. | No. 719. | Year | 1900. |
| *415 | " | 1887. | *555 | " | 1894. | 719a | " | 1901. |
| *416 | " | 1888. | *577 | " | 1895. | 813 | " | 1902. |
| *417 | " | 1889. | *612 | " | 1896. | 861 | " | 1903. |
| *418 | " | 1890. | 623 | " | 1886-96. | 896 | " | 1904. |
| *419 | " | 1891. | 640 | " | 1897. | 924 | " | 1905. |
| *420 | " | 1886-91. | 671 | " | 1898. | 981 | " | 1906. |
| *421 | " | 1892. | 686 | " | 1899. | | | |

**Mineral Resources Bulletins:—**

| | | |
|---|---|---|
| No. *818. Platinum. | No. 860. Zinc. | No. 881. Phosphate. |
| 851. Coal. | 869. Mica. | 882. Copper. |
| *854. Asbestos. | 872. Molybdenum and Tungsten. | 913. Mineral Pigments. |
| 857. Infusorial Earth. | *877. Graphite. | 953. Barytes. |
| 858. Manganese. | 880. Peat. | 984. Mineral Pigments. (French). |
| 859. Salt. | | |

**Reports of the Section of Chemistry and Mineralogy:—**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. *102. | Year | 1874-5. | No. 169. | Year | 1882-3-4. | No. 580. | Year | 1894. |
| *110 | " | 1875-6. | 222 | " | 1885. | 616 | " | 1895. |
| *119 | " | 1876-7. | 246 | " | 1886. | 651 | " | 1896. |
| 126 | " | 1877-8. | 273 | " | 1887-8. | 695 | " | 1898. |
| 138 | " | 1878-9. | 299 | " | 1888-9. | 724 | " | 1899. |
| 148 | " | 1879-80. | 333 | " | 1890-1. | 821 | " | 1900. |
| 156 | " | 1880-1-2. | 359 | " | 1892-3. | *958 | " | 1906. |

* Publications marked thus are out of print.

# REPORTS.

## GENERAL.

745. Altitudes of Canada, by J. White. 1899.
*972. Descriptive Catalogue of Minerals and Rocks, by R. A. A. Johnston and G. A. Young.
1073. Catalogue of Publications: Reports and Maps (1843-1909).
1085. Descriptive Sketch of the Geology and Economic Minerals of Canada, by G. A. Young, and Introductory by R. W. Brock. Maps No. 1084; No. 1042 (second edition), scale 100 m. = 1 in.
1086. French translation of Descriptive Sketch of the Geology and Economic Minerals of Canada, by G. A. Young, and Introductory by R. W. Brock. Maps No. 1084; No. 1042 (second edition), scale 100 m. = 1 in.
1107. Part II. Geological position and character of the oil-shale deposits of Canada, by R. W. Ells.

## YUKON.

*260. Yukon district, by G. M. Dawson. 1887. Maps No. 274, scale 60 m. = 1 in.; Nos. 275 and 277, scale 8 m = 1 in.
*295. Yukon and Mackenzie basins, by R. G. McConnell. 1889. Map No. 304, scale 48 m. = 1 in.
687. Klondike gold fields (preliminary), by R. G. McConnell. 1900. Map No. 688, scale 2 m. = 1 in.
884. Klondike gold fields, by R. G. McConnell. 1901. Map No. 772, scale 2 m. = 1 in.
*909. Windy Arm, Tagish lake, by R. G. McConnell. 1906. Map No. 916, scale 2 m. = 1 in.
943. Upper Stewart river, by J. Keele. Map No. 938, scale 8 m. = 1 in.
951. Peel and Wind rivers, by Chas. Camsell. Map No. 942, scale 8 m. = 1 in. } Bound together.
979. Klondike gravels, by R. G. McConnell. Map No. 1011, scale 40 ch. = 1 in.
982. Conrad and Whitehorse mining districts, by D. D. Cairnes. 1901. Map No. 990, scale 2 m. = 1 in.
1016. Klondike Creek and Hill gravels, by R. G. McConnell. (French). Map No. 1011, scale 40 ch. = 1 in.
1050. Whitehorse Copper Belt, by R. G. McConnell. Maps Nos. 1,026, 1,041, 1,044-1,049.
1097. Reconnaissance across the Mackenzie mountains on the Pelly, Ross, and Gravel rivers, Yukon, and North West Territories, by Joseph Keele. Map No. 1099, scale 8 m. = 1 in.

## BRITISH COLUMBIA.

212. The Rocky mountains (between latitudes 49° and 51° 30°), by G. M. Dawson. 1885. Map No. 223, scale 6 m. = 1 in. Map No. 224, scale 1½ m. = 1 in.
*235. Vancouver island, by G. M. Dawson. 1886. Map No. 247, scale 8 m. = 1 in.
236. The Rocky mountains, geological structure, by R. G. McConnell. 1886. Map No. 248, scale 2 m. = 1 in.
263. Cariboo mining district, by A. Bowman. 1887. Maps Nos. 278-281.
*271. Mineral wealth, by G. M. Dawson.
*294. West Kootenay district, by G. M. Dawson. 1888-9. Map No. 303, scale 8 m. = 1 in.
*573. Kamloops district, by G. M. Dawson. 1894. Maps Nos. 556 and 557, scale 4 m. = 1 in.
574. Finlay and Omineca rivers, by R. G. McConnell. 1894. Map No. 567, scale 8 m. = 1 in.
743. Atlin Lake mining division, by J. C. Gwillim. 1899. Map No. 742, scale 4 m. = 1 in.
939. Rossland district, by R. W. Brock. Map No. 941, scale 1,600 ft. = 1 in.
940. Graham island, by R. W. Ells. 1905. Maps No. 921, scale 4 m. = 1 in.; No. 922, scale 1 m. = 1 in.
986. Similkameen district, by Chas. Camsell. Map No. 987, scale 400 ch. = 1 in.
988. Telkwa river and vicinity, by W. W. Leach. Map No. 989, scale 2 m. = 1 in.
996. Nanaimo and New Westminster districts, by O. E. LeRoy. 1907. Map No. 997, scale 4 m. = 1 in.

*Publications marked thus are out of print.

1035. Coal-fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, by D. B. Dowling.
1093. Geology, and Ore Deposits of Hedley Mining district, British Columbia, by Charles Camsell. Maps Nos. 1095 and 1096, scale 1,000 ft.=1 in.; No. 1105, scale 600 ft.=1 in; No. 1106, scale 800 ft.=1 in.; No. 1125, scale 1,000 ft.=1 in.

ALBERTA.

*237. Central portion, by J. B. Tyrrell. 1886. Maps Nos. 249 and 250, scale 8 m.=1 in.
324. Peace and Athabaska Rivers district, by R. G. McConnell. 1890-1. Map No. 336, scale 48 m.=1 in.
703. Yellowhead Pass route, by J. McEvoy. 1898. Map No. 676, scale 8 m.=1 in.
*949. Cascade coal-fields, by D. B. Dowling. Maps (8 sheets) Nos. 929-936, scale 1 m.=1 in.
968. Moose Mountain district, by D. D. Cairnes. Maps No. 963, scale 2 m.=1 in.; No. 966, scale 1 m.=1 in.
1035. Coal-fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, by D. B. Dowling. Map No. 1,010, scale 35 m.=1 in.

SASKATCHEWAN.

213. Cypress hills and Wood mountain, by R. G. McConnell. 1885. Maps Nos. 225 and 226, scale 8 m.=1 in.
601. Country between Athabaska lake and Churchill river, by J. B. Tyrrell and D. B. Dowling. 1895. Map No. 957, scale 25 m.=1 in.
868. Souris River coal-field, by D. B. Dowling. 1902.
1035. Coal-fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, by D. B. Dowling. Map No. 1,010, scale 35 m.=1 in.

MANITOBA.

264. Duck and Riding mountains, by J. B. Tyrrell. 1887-8. Map No. 282, scale 8 m.=1 in.
296. Glacial Lake Agassiz, by W. Upham. 1889. Maps Nos. 314, 315, 316.
325. Northwestern portion, by J. B. Tyrrell. 1890-1. Maps Nos. 339 and 350, scale 8 m.=1 in.
704. Lake Winnipeg (west shore), by D. B. Dowling. 1898. Map No. 664, scale 8 m.=1 in.
705. Lake Winnipeg (east shore), by J. B. Tyrrell. 1898. Map No. 664, scale 8 m=1 in.
} Bound together.
1035. Coal-fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, by D. B. Dowling. Map No. 1010, scale 35 m=1 in.

NORTH WEST TERRITORIES.

217. Hudson bay and strait, by R. Bell. 1885. Map No. 229, scale 4 m.=1 in.
238. Hudson bay, south of, by A. P. Low. 1886.
239. Attawapiskat and Albany rivers, by R. Bell. 1886.
244. Northern portion of the Dominion, by G. M. Dawson. 1886. Map No. 255, scale 200 m.=1 in.
267. James bay and country east of Hudson bay, by A. P. Low.
578. Red lake and part of Berens river, by D. B. Dowling. 1894. Map No. 576, scale 8 m.=1 in.
*584. Labrador peninsula, by A. P. Low. 1895. Maps Nos. 585-588, scale 25 m.=1 in.
618. Dubawnt, Kazan, and Ferguson rivers, by J. B. Tyrrell. 1896. Map No. 603, scale 25 m.=1 in.
657. Northern portion of the Labrador peninsula, by A. P. Low.
680. South Shore Hudson strait and Ungava bay, by A. P. Low. Map No. 699, scale 25 m.=1 in.
713. North Shore Hudson strait and Ungava bay, by R. Bell. Map No. 699, scale 25 m.=1 in.
} Bound together.
725. Great Bear lake to Great Slave lake, by J. M. Bell. 1900.
778. East Coast Hudson bay, by A. P. Low. 1900. Maps Nos. 779, 780, 781, scale 8 m.=1 in.
786-787. Grass River region, by J. B. Tyrrell and D B. Dowling. 1900.

*Publications marked thus are out of print.

815. Ekwan river and Sutton lakes, by D. B. Dowling. 1901. Map No. 751, scale 50 m.—1 in.
819. Nastapoka islands, Hudson bay, by A. P. Low. 1900.
905. The Cruise of the *Neptune*, by A. P. Low. 1905.
1069. French translation report on an exploration of the East coast of Hudson bay, from Cape Wolstenholme to the south end of James bay, by A. P. Low. Maps Nos. 779, 780, 781, scale 8 m.—1 in.; No. 785, scale 50 m.—1 in.
1097. Reconnaissance across the Mackenzie mountains on the Pelly, Ross, and Gravel rivers, Yukon, and North West Territories, by Joseph Keele. Map No. 1099, scale 8 m.—1 in.

## ONTARIO.

215. Lake of the Woods region, by A. C. Lawson. 1885. Map No. 227, scale 2 m.—1 in.
*265. Rainy Lake region, by A. C. Lawson. 1887. Map No. 283, scale 4 m.—1 in.
266. Lake Superior, mines and mining, by E. D. Ingall. 1888. Maps No. 285, scale 4 m.—1 in.; No. 286, scale 20 ch.—1 in.
326. Sudbury mining district, by R. Bell. 1890-1. Map No. 343, scale 4 m.—1 in.
327. Hunter island, by W. H. C. Smith. 1890-1. Map No. 342, scale 4 m.—1 in.
332. Natural Gas and Petroleum, by H. P. H. Brumell. 1890-1. Maps Nos. 344-349.
357. Victoria, Peterborough, and Hastings counties, by F. D. Adams. 1892-3.
627. On the French River sheet, by R. Bell. 1896. Map No. 570, scale 4 m.—1 in.
678. Seine river and Lake Shebandowan map-sheets, by W. McInnes. 1897. Maps Nos. 589 and 560, scale 4 m.—1 in.
723. Iron deposits along the Kingston and Pembroke railway, by E. D. Ingall. 1900. Map No. 626, scale 2 m.—1 in.; and plans of 13 mines.
739. Carleton, Russell, and Prescott counties, by R. W. Ells. 1899. (*See* No. 739, Quebec.)
741. Ottawa and vicinity, by R. W. Ells. 1900.
790. Perth sheet, by R. W. Ells. 1900. Map No. 789, scale 4 m.—1 in.
961. Sudbury Nickel and Copper deposits, by A. E. Barlow (Reprint). Maps Nos. 775, 820, scale 1 m.—1 in.; Nos. 824, 825, 864, scale 400 ft.—1 in.
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1011. Bonanza and Hunker creeks. Auriferous gravels. Scale 40 chains=1 in.
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1026, 1044-1049. Whitehorse Copper belt. Details.

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1003. Rossland Mining camp. Topographical sheet. Scale 1,200 ft.=1 in.
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1105. 4A.—Golden Zone Mining camp. Scale 600 ft.=1 in.
1106. 3A.—Mineral Claims on Henry creek. Scale 800 ft.=1 in.
1125. Hedley Mining district: Structure Sections. Scale 1,000 ft.=1 in.

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892. Costigan coal basin, scale 40 ch=1 in.
929-936. Cascade coal basin. Scale 1 m.=1 in.
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1117. 5A.—Edmonton. (Topography). Scale ½ m.=1 in.
1118. 6A.—Edmonton. (Clover Bar Coal Seam). Scale ½ m.=1 in.
1132. 7A.—Bighorn Coal-field. Scale 2 m.=1 in.

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